

**[4910-13]**

**DEPARTMENT OF TRANSPORTATION**

**Federal Aviation Administration**

**Aviation Rulemaking Advisory Committee - New Task**

**AGENCY:** Federal Aviation Administration (FAA), DOT.

**ACTION:** Notice of a new task assignment for the Aviation Rulemaking Advisory Committee (ARAC).

**SUMMARY:** Notice is given of a new task assigned to and accepted by the Aviation Rulemaking Advisory Committee (ARAC). This notice informs the public of the activities of ARAC.

**FOR FURTHER INFORMATION CONTACT:** Anthony F. Fazio, Director, Office of Rulemaking, ARM-1, Federal Aviation Administration, 800 Independence Avenue, SW., Washington, DC 20591; telephone (202) 267-9677 or fax (202) 267-5075.

**SUPPLEMENTARY INFORMATION:**

**Background**

The FAA has established an Aviation Rulemaking Advisory Committee to provide advice and recommendations to the FAA Administrator, through the Associate Administrator for Regulation and Certification, on the full range of the FAA's rulemaking activities with respect to aviation-related issues. This includes obtaining advice and recommendations on the FAA's commitment to harmonize its Federal Aviation Regulations and practices with Europe and Canada.

**The Task**

This notice is to inform the public that the FAA has asked ARAC to provide advice and recommendation on the following harmonization task:

The ARAC Executive Committee will establish a Fuel Tank Inerting Harmonization Working Group. The Fuel Tank Inerting Harmonization Working Group will prepare a report to the FAA that provides recommended regulatory text for new rulemaking and the data needed for the FAA to evaluate the options for implementing new regulations that would require eliminating or significantly reducing the development of flammable vapors in fuel tanks on in-service, new production, and new type design transport category airplanes. The level of reduction in flammable vapors that would be proposed in this FAA rulemaking would be based on achieving the lowest flammability level that could be provided by a design that would meet FAA regulatory evaluation requirements. This effort is an extension of the previous work performed by the Fuel Tank Harmonization Working Group.

The report should contain a detailed discussion of the technical issues associated with the prevention of, or reduction in, the exposure of fuel tanks to a flammable environment through the use of the following inerting design methods, and any other inerting methods determined by the Working Group, or its individual members, to merit consideration.

Ground-Based Inerting: The system shall inert fuel tanks that are located near significant heat sources or do not cool at a rate equivalent to an unheated wing tank using ground based nitrogen gas supply equipment. The affected fuel tanks shall be inerted once the airplane reaches the gate and while the airplane is on the ground between flights.

On-Board Ground-Inerting: The system shall inert fuel tanks that are located near significant heat sources or are not cooled at a rate equivalent to an unheated wing

tank using on-board nitrogen gas generating equipment. The affected fuel tanks shall be inerted while the airplane is on the ground between flights.

On-Board Inert Gas Generating System (OBIGGS): The system shall inert all fuel tanks with an on-board nitrogen gas generating system such that the tanks remain inert during normal ground and typical flight operations. Non-normal operations are not to be included in the OBIGGS mission requirements. For example, the tanks should remain inert during normal takeoff, climb, cruise, descent, landing, and ground operations (except for ground maintenance operations when the fuel tank must be purged for maintenance access); however, the fuel tanks do not need to remain inert during non-normal operations such as during an emergency descent.

For the purposes of this task, an "unheated wing tank" is a conventional aluminum structure, integral tank of a subsonic transport wing, with minimum heat input from aircraft systems or other fuel tanks that are heated. This is the same definition provided in draft Advisory Circular 25.981-2X that was made available for comment by the notice published in the Federal Register on February 2, 2000.

The report shall provide detailed discussion of technical considerations (both pro and con), as well as comparisons between each of the above design methods for incorporation into the following portion of the large transport airplane fleet: (a) in-service airplanes, (b) new production airplanes, and (c) new airplane designs. Because the working group may consist of members having differing views regarding the technical issues associated with inerting fuel tanks, the report should include discussion of such views and any supporting information provided by the membership.

In developing recommendations to the FAA, the report should also include consideration of the following:

1. The threat of fuel tank explosions used in the analysis should include explosions due to internal and external tank ignition sources for the major fuel system designs making up the transport fleet, as defined in the July 1998 ARAC Fuel Tank Harmonization Working Group report. The service history in the analysis should be further developed to include incidents involving post crash fuel tank fires. The FAA awarded a research contract to develop a database that may be useful in this endeavor. This data should be evaluated when determining what benefits may be derived from implementing ground based or on-board inerting systems. The report is titled, A Benefit Analysis for Nitrogen Inerting of Aircraft Fuel Tanks Against Ground Fire Explosion, Report Number DOT/FAA/AR-99/73, dated December 1999.
2. The evaluation of ground-based inerting should consider:
  - a. The benefits and risks of limiting inerting of fuel tanks to only those times when conditions, such as lower fuel quantities or higher temperature days, could create flammable vapors in the fuel tank. This concept would be analogous to deicing of aircraft when icing conditions exist.
  - b. Various means of supplying nitrogen (e.g., liquid, gaseous separation technology; centralized plant and/or storage with pipeline distribution system to each gate, individual trucks to supply each airplane after refueling, individual separation systems at each gate, etc.), and which means would be most effective at supplying the quantity of nitrogen needed at various airports within the United States and, separately, other areas of the world.

c. Methods of introducing the nitrogen gas into the affected fuel tanks that should be considered include displacing the oxygen in fuel tanks with nitrogen gas, saturating the fuel with nitrogen in ground storage facilities (for example, in the trucks or central storage tanks), injecting nitrogen directly into the fuel as the fuel is loaded onto the airplane, and combinations of methods.

d. The benefits and risks of limiting inerting of fuel tanks to only those fuel tanks located near significant heat sources, such as center wing tanks located above air conditioning packs.

3. The evaluation of on-board ground-inerting should consider the benefits and risks of limiting inerting of fuel tanks to only those fuel tanks located near significant heat sources, such as center wing tanks located above air conditioning packs.
4. The evaluation of the cost of an OBIGGS for application to new type designs should assume that the design can be optimized in the initial airplane design phase to minimize the initial and recurring costs of a system.
5. Evaluations of all systems should include consideration of methods to minimize the cost of the system. For example, reliable designs with little or no redundancy should be considered, together with recommendations for dispatch relief authorization using the master minimum equipment list (MMEL) in the event of a system failure or malfunction that prevents inerting one or more affected fuel tanks.
6. Information regarding the secondary effects of utilizing these systems (e.g., increased extracted engine power, engine bleed air supply, maintenance impact,

airplane operational performance detriments, dispatch reliability, etc.) must be analyzed and provided in the report.

7. In the event that the working group does not recommend implementing any of the approaches described in this tasking statement, the team must identify all technical limitations for that system and provide an estimate of the type of improvement in the concept (i.e., manufacturing, installation, operation and maintenance cost reduction, etc.; and/or additional safety benefit required) that would be required to make it practical in the future.
8. In addition, guidance is sought that will describe analysis and/or testing that should be conducted for certification of all systems recommended.

Unless the working group produces data that demonstrates otherwise, for the purposes of this study a fuel tank is considered inert when the oxygen content of the ullage (vapor space) is less than ten per cent by volume.

The ground-based inerting systems shall provide sufficient nitrogen to inert the affected fuel tanks while the airplanes are on the ground after landing and before taking off for the following flight. In addition to the ground equipment requirements and airframe modifications required for the nitrogen distribution system, any airframe modifications required to keep the fuel tank inert during ground operations, takeoff, climb, and cruise, until the fuel tank temperatures fall below the lower flammability range, should be defined.

The on-board ground inerting systems shall be capable of inerting the affected fuel tanks while the airplane is on the ground after touchdown and before taking off for the following flight. As for the ground-based inerting system, in addition to the inert gas

supply equipment and distribution system, any airframe modifications required to keep the fuel tank inert during ground operations, takeoff, climb, and cruise, until the time the fuel tank temperatures fall below the lower flammability range, should be defined.

Consideration should be given to operating the on-board inert gas generating system during some phases of flight as an option to installing equipment that might otherwise be necessary (e.g., vent system valves) to keep the fuel tank inert during those phases of flight, and as a cost tradeoff that could result in reduced equipment size requirements.

The data in the report will be used by the FAA in evaluating if a practical means of inerting fuel tanks can be found for the in-service fleet, new production airplanes, and new airplane designs. The FAA may propose regulations to further require reducing the level of flammability in fuel tanks if studies, including this ARAC task and independent FAA research and development programs, indicate that a means to significantly reduce or eliminate the flammable environment in fuel tanks, beyond that already proposed in Notice 99-18, is practical. Such a proposal would be consistent with the recommendations made by the ARAC Fuel Tank Harmonization Working Group in their July 1998 report.

The report shall be submitted to the FAA within 12 months after the date of this notice.

### **ARAC Acceptance of Task**

ARAC has accepted this task and has chosen to assign it to a new Fuel Tank Inerting Harmonization Working Group. The new working group will serve as staff to

the ARAC Executive Committee to assist ARAC in the analysis of the assigned task. Working group recommendations must be reviewed and approved by ARAC. If ARAC accepts the working group's recommendations, it will forward them to the FAA as ARAC recommendations.

The Fuel Tank Inerting Harmonization Working Group should coordinate with other harmonization working groups, organizations, and specialists as appropriate. The working group will identify to ARAC the need for additional new working groups when existing groups do not have the appropriate expertise to address certain tasks.

### **Working Group Activity**

The Fuel Tank Inerting Harmonization Working Group is expected to comply with the procedures adopted by ARAC. As part of the procedures, the working group is expected to:

1. Recommend a work plan for completion of the task, including the rationale supporting such a plan, for consideration at the ARAC Executive Committee meeting held following the establishment and selection of the working group.
2. Give a detailed conceptual presentation of the proposed recommendations, prior to proceeding with the work stated in item 3 below.
3. Draft a report and/or any other collateral documents the working group determines to be appropriate.
4. Provide a status report at each meeting of the ARAC Executive Committee.

### **Participation in the Working Group**

The Fuel Tank Inerting Harmonization Working Group will be composed of experts having an interest in the assigned task. Participants of the working group should be prepared to devote a significant portion of their time to the ARAC task for a



12-month period. A working group member need not be a representative or a member of the committee.

An individual who has expertise in the subject matter and wishes to become a member of the working group should contact: Regina L. Jones, ARM-23, Office of Rulemaking, Federal Aviation Administration, 800 Independence Avenue, SW., Washington, DC 20591; telephone (202) 267-9822, fax (202) 267-5075, or e-mail Regina.Jones@faa.gov, expressing that desire, describing his or her interest in the tasks, and stating the expertise he or she would bring to the working group. All requests to participate must be received no later than August 11, 2000. The requests will be reviewed by the ARAC chair, the executive director, and the working group chair, and the individuals will be advised whether or not requests can be accommodated.

The Secretary of Transportation has determined that the formation and use of ARAC are necessary and in the public interest in connection with the performance of duties imposed on the FAA by law.

Meetings of the ARAC Executive Committee will be open to the public. Meetings of the Fuel Tank Inerting Harmonization Working Group will not be open to the public, except to the extent that individuals with an interest and expertise are selected to participate. No public announcement of working group meetings will be made.

Issued in Washington, DC, on July 10, 2000

/s/ Anthony F. Fazio  
Executive Director  
Aviation Rulemaking Advisory Committee